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THESIS

**FIRST-TERM ATTRITION DUE TO
PREGNANCY IN THE MARINE CORPS:
ISSUES, TRENDS, AND OPTIONS**

by

John R. Flatter

March 1996

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FIRST-TERM ATTRITION DUE TO PREGNANCY
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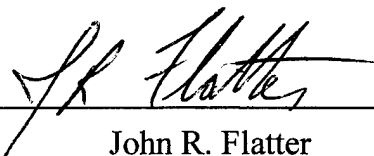of the requirements for the degree of

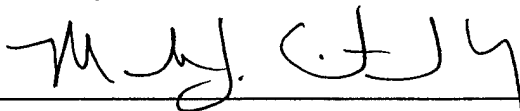## MASTER OF SCIENCE IN MANAGEMENT

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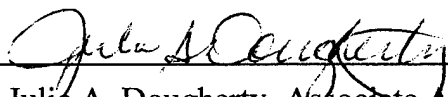
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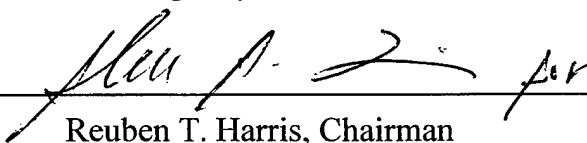March 1996

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ABSTRACT

The purpose of this thesis is to provide Headquarters Marine Corps with an analysis of pregnancy attrition and an evaluation of related policy options. The study also compares the Marine Corps' experience with that of the civilian population. The research methods include cross-tabulations and multivariate regression analysis. The data were obtained from Defense Manpower Data Center files of enlisted cohorts for fiscal years 1981, 1985, and 1988-1991. The results show that pregnancy rates in the Marine Corps are at levels either equal to or lower than what should be expected. In addition, pregnancy attrition rates have been decreasing steadily. It is recommended that the Marine Corps revise its pregnancy education program to address unwanted and unplanned pregnancies, which likely account for the majority of pregnancy attrition cases. Further initiatives are recommended to assist the Marine Corps in achieving its goals of increased female representation and lowered rates of pregnancy attrition.

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I. INTRODUCTION

A. BACKGROUND

It is clear that unscheduled turnover or non-EAS (End of Active Service) attrition among first-term Marines is an issue of significant proportions. The classic adage of in recruit training, "look to the left and look to the right--one of those Marines will not be here," is very fitting. Currently, over one-third of all new Marines do not complete their first term of enlistment.

It is widely known that women tend to leave the Marine Corps at significantly higher rates than men during the first term of service. At last count, over 50 percent of all female Marines "attrited"[1] for one reason or another before completing their first enlistment. A major contributor to this higher rate of female attrition relates to pregnancy. The relationship between pregnancy and attrition is the result of an unofficial, yet empirically evident, "pregnancy-equals-discharge" policy. That is, traditionally, an atmospheres been prevalent such that, if a Marine became X pregnant, her early discharge Reconsidered imminent. In fiscal year 1991, for example, more than one out of every eight women recruited into the Marine Corps was discharged for pregnancy.

In the past, the loss of over one-third of all men and one-half of all woman could be written off as just another cost of maintaining an elite fighting force. Those times are gone forever. Even the renowned penny-pinching tactics that have carried the day throughout the Marine Corps' history can no longer overcome the extreme costs of such high attrition. The Marine Corps recognizes that it must get personnel attrition under control.

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[1]The term "attrite" is commonly used in military manpower studies, and, in this context, refers to personnel who are discharged from the Marine Corps prior to the completion of their obligated first term of service.

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The relatively high rate of first-term attrites for female Marines is especially problematic in light of future plans to expand opportunities for women in the Marine Corps. Women currently represent about 4 percent of all enlisted personnel in the Marine Corps, and this representation level is expected to grow to 6 percent in the years ahead. In addition, the Marine Corps plans to assign increasing numbers of women to nontraditionally-female occupations--placing new demands on the service of women in a variety of career fields.

B.   THESIS OVERVIEW

In reference to first-term attrition, Marine Corps Commandant, General Charles Krulak, stated in his planning guidance: "I do not want another study. I want a plan." [Ref. 38] Therefore, the focus of this thesis is on providing recommendations for action.

The particular aspect of attrition addressed in the thesis resulted from conversations and correspondence with the Manpower Planning and Recruiting Command offices at Headquarters Marine Corps.

The main objective of the study is to provide Headquarters Marine Corps with:

- An objective analysis of the pregnancy attrition issue.

- Recommendations for programs or policies that may encourage women to delay their pregnancy until they have completed their initial enlistment.

- Recommendations for manpower management policies that address the human resource issues associated with pregnant Marines.

C.   DIFFERENCES FROM PAST ATTRITION RESEARCH

This research compares and contrasts the Marine Corps' experiences with other organizations, such as civilian municipalities and other branches of the Armed Forces.

Additionally, it pulls together the findings of several other pregnancy and attrition-related studies into one centralized reference. Lastly, it evaluates policy implications for all four Armed Forces.

D.   RESEARCH QUESTIONS AND SCOPE

Two major questions are addressed in the study:

- What are the demographic characteristics associated with the occurrence of pregnancy among civilians, sailors, and Marines?

- What are the policy alternatives available for the Marine Corps to deal with the issue of pregnancy?

The study only explores policy or management options. A true policy feasibility analysis is far beyond the scope of this research. Therefore, the costs of important factors or considerations such as recruitment and retention are mentioned only briefly. Additionally, issues such as personnel morale, productivity, and quality of life are not discussed. Finally, the moral, financial, and guardianship responsibilities held by the sexual partners of these pregnant Marines are not addressed in the study.

The definition of "pregnancy" in this research is limited to female Marines who received a pregnancy separation during their first enlistment. This limitation undercounts the actual occurrence of pregnancy among Marines. In addition, aborted pregnancies, miscarriages, and women who remained on active duty are not reflected in this manner. Further, pregnancies that went unreported and did not lead directly to a first-term discharge are not included here.

Survey data were not obtained to explore the way in which women view traditional roles and responsibilities related to motherhood. Certain demographic variables are useful in differentiating such views among groups of women; but survey research was considered outside the scope of this thesis.

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The thesis is organized into seven chapters. The first chapter provides an introduction to the research area. Chapter II presents a review of the current literature on Marine Corps attrition as well as civilian attrition patterns, labor economics issues, and recruit screening. The third chapter discusses the data used in the thesis and the methods employed to analyze the data. Chapter IV presents a comprehensive look at demographic comparison of Marines, civilians, and sailors. The fifth chapter provides a discussion of the frequency analysis and regression model outcomes. Chapter VI discusses policy alternatives that address the pregnancy issue. The last chapter contains conclusions and recommendations.

II. LITERATURE REVIEW

A.   GENERAL

Personnel attrition is an issue that has consistently dogged military manpower planners, especially since the inception of the All-Volunteer Force in 1973. To gain an understanding of this perennial problem, several related areas must be studied. This chapter discusses relevant literature to provide a working knowledge, first, of generic personnel attrition and, then, of pregnancy attrition in particular.

B.   RECRUITING

1.   Screening

Military manpower planners are constantly in search of ways to improve the personnel selection process. Eitelberg [Ref. 1] states that, as early as the 1950s, researchers had discovered a relationship between a person's educational attainment and his or her chances of success in the military. In 1975, Lockman [Ref. 2] developed the first formal screening process for the Navy by modeling first-year losses of sailors who enlisted in 1973. The outcome of this research was the Navy's Success Chances of Recruits Entering the Navy (SCREEN) model, which is still used today in modified form. The SCREEN model employs age, educational level, Armed Forces Qualification Test (AFQT) category, and dependent status as predictors of an enlistee's probability of success or failure during the first enlistment. These variables have become the "traditional" indicators of a person's likelihood of success, with a high school diploma being the most accurate and reliable predictor. Quester, North, and Kimble [Ref. 3] added to the SCREEN model by including gender, race, region of entry, Delayed Entry Program (DEP) participation, and marital status. The results of their study identified individual characteristics of successful recruits.

2. Labor Economics

In a 1984 study, Baldwin and Daula [Ref. 4] cited Department of Defense estimates placing the cost of recruiting a "high-quality" enlistee at about $4,500 compared with $1,200 for all others. Even if planners decide that this monetary difference between high-quality and low-quality recruits is worth the cost to reduce attrition, the labor market must be able to provide enough high-quality recruits to fill the demand. Since the labor market is not infinitely large, this presents a real problem. U.S. Census data clearly show that the pool of age-eligible, potential recruits declined from about 1980 onward and bottomed out in 1995. Additionally, the Youth Attitude Tracking Study of 1988 shows that the propensity, or expressed desire, of enlistment-eligible youth has been falling since 1980 [Ref. 17]. Further, Brigadier General Jack Klimp, Commanding General of the Parris Island Recruit Depot, has observed that the Marine Corps is "probably in the most challenging recruiting environment we have experienced since the mid-1970s. With the downsizing, there is less and less contact between the military and the American people" [quoted in Ref. 5].

3. Costs

In 1993, Quester [Ref. 48] estimated that the replacement cost for each Marine lost to attrition is around $40,000. May [Ref. 42] estimated, in 1985, that the Marine Corps spent in excess of $87 million annually on first-term attrition. Adjusting for 10 years of inflation since 1985, these total annual costs would have been about $120 million in 1995.

C. GENERAL ATTRITION PATTERNS

Despite the Marine Corps' best efforts to reduce the rate of first-term attrition among its personnel, these rates have hovered around 30 percent since the inception of the All-Volunteer Force. North [Ref. 6] shows specifically that 11-12 percent of

recruits fail to complete boot camp; by six months of service, 13-15 percent have washed out; and for every three months thereafter until the 48-month mark, another 3 percent leave the Marine Corps. These rates have remained fairly stable over the years in spite of the fact that the quality of recruits (i.e., persons in the upper 50th percentile of the AFQT and a high school graduate) has risen considerably. Quester [Ref. 7] shows that the mix of Marine Corps recruits with a high school diploma and AFQT percentile score of 50 or above has increased from less than 30 percent in 1979 to over 70 percent in 1992. Cooke and Quester [Ref. 8] show very similar rates for the Navy between 1978 and 1982. Maze [Ref. 9] quotes the Service-wide averages at 18 percent failing to complete their first year of service, with 23 percent lost before two years, and 30 percent separated before the three-year mark.

Education and aptitude have been shown over the years to be strong predictors or correlates of success (or failure) in the military. [Ref. 3] First-term attrition also increases as the age at initial enlistment of the male recruit increases. Buddin [Ref. 10], for example, points out that this pattern holds true for all Services but is especially strong in the Marine Corps. For example, an increase of only one year, from 18 years old to 19 years old for a recruit at time of enlistment, increases the likelihood of his or her attrition by 4.2 percent. This compares with a 1.7 percent increase in the Army and Navy. Race is similarly significant in determining one's pattern of success or failure during the first term. Blacks, for example, have historically had higher success rates than their non-black peers in each of the Military Services [Ref. 3].

D.   FEMALE ATTRITION PATTERNS

Female attrition patterns during the first term of enlistment vary greatly from those of their male counterparts. Royle [Ref. 11] states that nearly 50 percent of all female Marines fail to complete their initial enlistment. This compares with a rate of

about 30 percent for male Marines. Higher rates of female attrition occur for almost every time interval up to 48 months and for nearly every demographic characteristic across genders. However, the Marine Corps should not be totally surprised by this attrition gap between the sexes. As Waite and Berryman [Ref. 39] state, "data for the labor force as a whole have historically shown higher turnover rates for women than for men."

Additionally, the attributes that predict success for men are not necessarily valid for women. The foremost difference in female attrition relates to pregnancy. Quester and Steadman [Ref. 12] claim that approximately one-third of all female attrition is due to pregnancy. They go on to say that, if pregnancy-related separations were removed from the figures, female and male attrition rates would be nearly identical. In a follow-on study, Royle [Ref. 13] discovered that "traditionality" measures (e.g., how much a woman identifies with traditionally-female roles) significantly affected a female Marine's propensity to leave the service prematurely.

As significant as it is, pregnancy is not the only difference between male and female attrition. Quester and Steadman [Ref. 12], for example, point out that educational background does not have the same degree of validity in predicting success for female Marines as it does for their male counterparts. Furthermore, they find that age at the time of enlistment is likewise not the same in predicting attrition for men and women. In fact, the risk of attrition is highest for the youngest female Marines, and it declines as the age at initial enlistment increases. This relationship of attrition and age is the complete opposite for their male counterparts, who become more likely to leave the Marine Corps prematurely as the age of the recruit increases. Additionally, Waite and Berryman [Ref. 39] claim that there is a relationship between formal-school training time and attrition for women. They state: "Our analysis of

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women showed that those in the military who had received substantial formal training for their occupation were less likely to leave than those without formal training...."

Other factors may increase the likelihood of a female recruit becoming pregnant. Kost and Forrest [Ref. 26], for example, claim that "some socioeconomic groups...such as those who are unmarried, young, ...and low income, ...have disproportionately higher leves of unintended childbearing" than their otherwise similar peers. It is interesting to observe that this demographic portrait reflect the profile of women in the pool of prospective recruits for the Marine Corps.

E. CHANGING FORCE MIX

The winds of change are blowing in our nation. Women are slowly but surely weaving their way throughout the fabric of the military establishment. The society that Marines have sworn to defend is demanding that women be allowed to participate ina broader range of military life. The Department of Defense [Ref. 49] lists the Marine Corps proportion of enlisted female Marines at 4.5 percent as of 1994. This figure is up slightly from 4.1 percent in 1983 [Ref. 14] and is fourfold higher than the 1 percent level that was maintained when women were initially allowed into the regular Marine Corps in 1948. The earliest female Marines were allowed in 27 of the 43 occupational fields, yet, in actuality, they were clustered into a small number of "traditionally-female" areas. Much the same is true today. Either as the result of self-selection, assignment policy, or legal restrictions, women are still over-represented in traditionlly-female occupations. Partially because of society's will, and partly due to the necessities of the current labor market, the Marine Corps is embarking on a campaign to not only increase its overall proportion of women, but also to increase female representation in nontraditional field.

Despite the clustering of women in some Military Occupational Specialities (MOSs), the Marine Corps is currently more evenly distributed with respect to gender than is the civilian labor force. As Waite and Berryman [Ref. 39] stated in 1986:

> ...the services have opened all military occupations, except combat jobs, to women and have enlisted and trained them in these occupations. For example, 34 percent of the women in the military, but only 3 percent of the women in civilian organizations, worked in occupations that were less than 10 percent female.

Fuentes [Ref. 15] observes that, over the next 20 years, the Marine Corps plans to fill a minimum of 6 percent of the enlisted force and 7.3 percent of its officer corps with women. These goals will be met through increased female recruitment, more training for women Marines, and assigning women across more job specialties.

By their own estimates, Marine Corps recruiting officials forecast that, to reach a level of 6 percent women in the enlisted ranks, it must ensure that 7.3 percent of all recruits are women. Waite and Berryman [Ref. 39] hypothesized in their research that, "as the nontraditionality of the occupation increases, the probability of (female) turnover increases." With respect to the Marine Corps, they add:

> Because stereotypically the Marine Corps is seen as the most traditionally male of the four military branches and because women make up a substantially smaller proportion of its enlisted forces (4.5 percent in 1981 vs. 11.5 percent in the Air Force), we predict a positive effect of a Marine Corps enlistment on (female) turnover.

If the Canadian experience and that of the other US services offer any indication, the Marine Corps' plan to increase female representation should not present a problem. In 1984, Cotton and Pinch [Ref. 16] reported that the female

representation in the Canadian Defense Forces was 8.7 percent. This amounted to a quadrupling from 2 percent at the beginning of the 1960s. Women were also represented in 65 percent of all Canadian military occupational fields. As of 1994 [Ref. 49], women represented 12.1 percent of all enlisted personnel throughout the Department of Defense--up from about 2 percent at the start of the All-Volunteer Force in 1973. The 1994 total included 12.9 percent of personnel in the Army, 15.7 percent in the Air Force, and 11.0 percent in the Navy. During fiscal year 1995, in fact, of all new recruits in the Navy, 16.8 percent were women--perhaps signaling a trend of even greater increases in female participation in the Navy over the years ahead. It is notable that this 16.8 percent female-sailor accession rate is considerably higher than the 5.4 percent female accession rate in the Marine Corps. [Ref. 49]

F.   SUMMARY

Current economic, social, and budgetary conditions demand that the Marine Corps confront the issue of pregnancy attrition head-on. However, several obstacles lie between the Marine Corps' desire to reduce attrition and its goal of increased female representation. Since many of the issues discussed in this literature review are not mutually exclusive, changing one factor would likely affect another. Two obvious conflicts are: (1) An already-shrinking, age-eligible recruit pool would be further reduced by increased screening of applicants in order to lower attrition; and (2) Any policy to increase female participation must take account of first-term attrition, which, if left unchecked, would likely remain at 50 percent for women or perhaps rise to a higher level. The bulk of the thesis is devoted to sorting through these conflicts and identifying possible approaches for reducing attrition due to pregnancy.

III. DATA AND METHODS

A.   DATA

1.   Data Files

A cohort file is defined as a data set that contains only persons associated by some common characteristic. For the purposes of this study, a cohort is determined by the fiscal year of enlistment. That is, cohort 1991 consists of all persons enlisted between 1 October 1990 and 30 September 1991. These persons are then tracked through time, and the data set is updated to reflect promotions, discharges, and other changes in status.

Marine Corps data for this study were obtained from the Defense Manpower Data Center (DMDC). The primary source was the Military Entrance Processing Command (MEPCOM) 195/byte military (enlisted) accession edit files. The 195/byte MEPCOM accession files are matched annually with the Department of Defense (DOD) active duty enlisted master inventory and loss files to get the most recent information on each service member.

Each resulting data set includes two types of information:

(1)   Data from entry that do not vary, such as entry age, home of record, enlistment option, and so on.

(2)   Data that vary over time, such as marital status, pay grade, separation date, and the like.

The data sets used in this research consisted of six Marine Corps cohort files and one Navy cohort file:

(1)   **Marine Corps**. The year 1991 was used as the base. It was therefore the starting point for choosing all of the other cohort years. The year 1991 was selected because it was the most recent fiscal year that provided at least 45 months of

expired time (as of late-1995) with which to measure attrition. (Persons who entered the Marine Corps during the last month of fiscal 1991 would have had 50 months of possible service by December 1995, the time the data set was constructed.) At the same time, 1981 was chosen to provide comparison data from 10 years prior to the 1991 data; 1985 was selected to provide a mid-point for observations somewhere between 1981 and 1991; and 1988/1989/1990 were chosen to provide a continuous timespan of comparison years leading up to 1991.

(2)   **Navy.** The year 1988 was chosen because, as with 1991 cohort for the Marine Corps, this was the most recent year available that provided 45 months of updated information on Navy enlistees. Navy data were also available for 1989 and 1990 cohorts, but the available data files were compiled over three years ago, and did not contain the needed months of updates by DMDC.

2.   Methods

Two research methods were employed in an effort to address the issue of pregnancy attrition. These were frequency analysis and regression analysis.

Frequency Analysis

Frequencies and means were computed as crosstabulations of attrition cases by individual demographic characteristics to explore the pregnancy attrition issue. This frequency analysis was performed on the entire population of all six Marine Corps data sets and with subsets of those populations. Additionally, this same analysis was conducted with the 1988 Navy Enlisted Cohort.

Although some interesting questions can arise from frequency analysis, great care must be taken not to draw too much from the results. Placing too much weight on this type of analysis runs the risk of assuming that "correlation equals causation." Just because a correlation is observed between two variables, such as age and attrition, does not mean that there is necessarily a direct relationship of cause and

effect between the two. Therefore, this frequency analysis must be viewed as just one way of understanding the connection between selected personal characteristics and behavior. Some type of multivariate analysis should also be employed to further study differences found in the frequency analysis.

Regression Analysis

A great advantage of regression analysis is that it isolates each demographic characteristic one at a time and then analyzes its effect upon the variable being studied. All other variables are held constant while this one particular characteristic is being analyzed. In this way, the main weakness of a frequency analysis is overcome; and observed effects are either supported as "causation" or attributed to chance.

For example, if a frequency analysis shows that men experience a higher rate of attrition than do women in the 20-24 year old age group, then a regression analysis can be conducted to determine if this observed occurrence is, in fact, contributing to higher attrition.

3. **Variable Definitions**

General

The following discussion explains the variables, model specifications, and procedures used in both types of analysis mentioned above. There are two categories (dependent or explanatory) and two types (continuous or dichotomous) of variables used in this research. Variable categories and types are explained below:

Variable Category

Dependent Variables. Dependent variables are those for which a causation effect is being sought.

Explanatory Variables. Explanatory variables perform a function that mirrors their name--that is, they explain the changes in the dependent variable. In a

regression model, each explanatory variable is given a number (coefficient) that reflects how much of an effect it is estimated to have upon the dependent variable.

Variable Type

Continuous. Continuous variables consist of a constant stream of possible alternatives for a given variable. Entry age and AFQT percentiles are good examples of continuous variables.

Dichotomous. Dichotomous variables consist of either/or variables. That is, either "yes," the person fits a given variable or, "no," the person does not. Married/unmarried and high school graduate/high school nongraduate are good examples of dichotomous variables used in this analysis.

Model Specifications

Several regression models are available, depending upon the specifics of the research being conducted. The logistic regression model was chosen because the dependent variables analyzed in this research are dichotomous. With a dichotomous dependent variable, logistic regression analysis provides more accurate predictions than does a linear regression model. A linear model would provide predictions based upon the assumption that all of the data would lie in a linear pattern. With a dichotomous dependent variable, the data are more likely to lie in an "S-shaped" pattern. The logistic regression model compensates for this fact.

Research Dependent Variables

Attrite. The variable ATTRITE is defined as anyone who did not successfully complete a first enlistment. A combination of the total months of active service and inter-service separation codes (ISCs) were used to measure this success parameter. Specifically, if a person had an ISC that reflected an attrition-related discharge, such as bad conduct or drugs, and was discharged before a certain number of months of active service were completed, he or she was labeled an "attrite." ISCs

that were either unavoidable, such as "death," or beneficial to the Marine Corps, such as "entry into officer program," were not included as attrites. For fiscal years 1981 and 1985, the service period was set at 33 months due to the popularity of three-year enlistments during the early 1980s. For all other years, including the Navy cohort, the service period was set at 45 months, due to the overwhelming popularity of the four-year enlistment. In line with most other attrition research, a three-month grace period was allowed for all attrition definitions. That is, if a person survived until at least three months before the end of their obligated service, they were considered a non-attrite, regardless of their separation code. Additionally, past research has determined that if a person enlists for 5, 6, 7, or more years and then remains in service for over 45 months, his or her likelihood of attriting is small.

Pregnant. The variable PREGNANT is simply defined as anyone who received an ISC of 94 and served less than 33 or 45 months of active duty. ISC 94 is the separation code for enlisted pregnancy. Defining pregnancy in this way is somewhat problematic, but, as discussed above in the introduction, given the alternatives, it is still the most accurate means available.

Research Demographic Characteristics

RACE. These variables are self explanatory with the exception of "OTHR_MIN." Minorities included in this category are non-Caucasians who are neither Black nor Hispanic. The category OTHR_MIN thus includes Asians, Pacific Islanders, and Native Americans. All race variables are dichotomous.

AFQT_PCT. This variable is a continuous variable that lists the AFQT percentile score for each person. A percentile score reflects how the individual's performance on the test relates to the score distribution of the general (norming) population. For example, a score in the 50th percentile is at the approximate midpoint

or mean for all expected scores derived from administering the test to the general population of young adults (as defined by age in the norming process).

Education. The education variables used in the models are dichotomous and list the level of education a person possessed at entry. Other education variables were available that list the current education level, but so few changes occur during a first enlistment that it is not productive to compare the two levels. Education variables include:

- **NON_GRAD.** Anyone who had an education level below a GED or other high school equivalency.

- **HS_EQUIV.** Anyone who possessed a GED or other high school equivalency.

- **HS_GRAD.** Anyone who possessed a high school diploma.

- **SUMCOLGE.** Anyone with some identified college course work but not enough for an undergraduate degree.

- **COL_GRAD.** Anyone with a Bachelor's degree or higher.

Delayed Entry. The Delayed Entry Program(DEP) allows new recruits to enlist in the Marine Corps but not enter active duty for up to a year. The delayed entry variables are broken into quarterly increments. They are:

- **DEP_NON.** No participation in delayed entry.

- **DEP_ONE.** One quarter of participation.

- **DEP_TWO.** Two quarters of participation.

- **DEP_TRE**. Three quarters of participation.

- **DEP_FOR**. Four quarters of participation.

ALT_MOS. Any person who has a duty MOS that does not match their primary MOS is defined as an "altered MOS."

WAIVED. Any person who received some sort of waiver at enlistment.

YOUTH. This category includes all identifiable youth programs, such as Junior Reserve Officer Training Corps, Sea Cadets, etc...

ADD_DEPS. Any person who obtained additional dependents during the enlistment was labeled as an "added dependents."

MARRIED. Any person who is currently married.

Occupational Traditionality. This variable rates the "traditionality" of an occupation as suggested in Ref. 51. The logic is that, if a woman works in an occupation considered "traditionally male" in the civilian workforce, she is said to be occupationally "non-traditional." Although not directly comparable to the civilian workforce, this same logic was applied to all Marine Corps occupational specialties. The occupational traditionality categories are:

- **TRAD_FEM**. This category covers all MOSs that are considered traditionally-female in the civilian community. For example, all "clerk" MOSs were included in this category.

- **NON_TRAD**. This category covers all MOSs that are considered traditionally-male in the civilian community. For example, MOSs included here are Crash/Fire Rescue, Welder, Heavy Equipment Operator, and so on.

- **ALL_MALE**. This category includes all of the combat MOSs, which are closed to women in the Marine Corps.

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- **EITHR_OR**. This category includes any MOS that could not be typed as either traditionally-male or traditionally-female. For example, included here are MOSs such as Military Police, Technician, and Public Affairs.

Age at Entry. These variables list the person's age at the time of enlistment. Categories included the following:

- **ENTR_AGE**. Specific age at time of enlistment.

- **LOW_AGE**. 19 years old or less at enlistment.

- **MID_AGE**. 20-24 years old at enlistment.

- **HIGH_AGE**. 25-29 years old at enlistment.

- **OVER_AGE**. 30 and over at enlistment.

MONTHS. This variable displays the number of months that the person has completed either at the time of discharge or at the data set's latest update.

Pregnancy-Related Demographic Statistics. This category reflects the demographic status of civilian pregnancy trends for comparison with the Marine Corps. Included are:

- **Live Births**. This statistic reflects the number of births that result for all pregnancies. It differs from the pregnancy rate due to the occurrence of miscarriages and abortions.

- **Out of Wedlock Births**. This statistic refers to live births in which the mother is not married.

- **Single Parenthood**. This statistic is a function of out of wedlock mothers who remain single as they raise the child or children.

- **Unintended Pregnancy.** This variable is defined as any pregnancy that was not planned. Unintended pregnancies may be either unwanted or wanted but mis-timed.

Variable Significance

The significance of an explanatory variable determines whether or not the variable has a true effect upon the dependent variable, based on the regression model. If the association is not significant, then any apparent association is believed to occur by mere chance. The significance measure is an important benefit in using a regression model along with frequency comparisons.

Measured by the percentage chance that the model is wrong, 5 percent significance is the accepted standard. A 5-percent measure of significance states that, if a relationship between the dependent and explanatory variable is determined to be significant, there is only a 5-percent chance that this relationship is due to mere chance.

It is up to the researcher to determine what level of statistical significance he or she is willing to accept. Depending upon the situation, 10 percent significance may be accepted. However, significance levels higher than 5-percent tend to be the exception rather than the rule. Throughout this thesis, unless otherwise stated, any variable labeled as significant is therefore significant at or below the standard 5-percent level.

Coefficient Sign

A negative coefficient implies that the indicated variable decreases a person's chance of leaving the Marine Corps prematurely (attriting). For example, if the AFQT_PCT variable is negative, then it means that, as the AFQT increases, a person's chance of attriting decreases. A negative dichotomous variable, say,

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HISPANIC, would mean that being of Hispanic origin decreases a person's chance of attriting.

IV. DEMOGRAPHIC COMPARISONS OF COHORT GROUPS

A Harvard psychology professor was asked a few years ago for information on the demographic characteristics of women that could be used to develop pregnancy avoidance policies. The answer was: "Clearly, relatively little is known." [Ref. 39] This chapter is an attempt to shed some light on the matter.

AGE AT ENTRY

As seen in Table 1, there is not much fluctuation across the average ages at entry with respect to attrition/non-attrition status or pregnancy among Marines in the 1991 cohort. What is interesting, however, is the variation in percentage represen- tation for the different age groups. For example, approximately 73 percent of all non- attrite men are from the 19 and under age group; yet, just under 68 percent of male attrites are from this age group. The 5.3 percentage point differential suggests that younger men tend to be somewhat more successful than their older counterparts. Similar inferences can be drawn from other comparisons.

Another relatively large disparity exists in the group of women who are 19 and under. Nearly 67 percent of the female attrition cases came from this age group, compared with 73.4 percent of all pregnancy attrition. This gap of 6.6 percentage points may suggest that younger women are more likely to become pregnant.

FEMALE REPRESENTATION

Despite the fact that the number of new recruits has fallen steadily since 1981, the proportion of female recruits in the Marine Corps has not changed much over the past ten years. As seen in Table 2, the proportion of female recruits rose to a high of 6.4 percent of accessions in 1985 and then fell to about 5.5 percent in the early 1990s.

Table 1.   Percentage Distribution of Marine Corps Enlisted
             Personnel by Age at Entry, Gender, and Attrition
             Status, USMC 1991 Cohort

Age at Entry (years)	Male		Female		
	Non-Attrite	Attrite	Non-Attrite	Attrite	Pregnancy Attrite
19 and under	73.0	67.7	70.7	66.8	73.4
20-24	24.8	28.9	24.6	28.9	24.1
25-29	2.1	3.3	4.7	4.2	2.5
30 and over	0.1	0.1	0.0	0.1	0.0
Total	100.0	100.0	100.0	100.0	100.0
Average Age at Entry	19.2	19.4	19.2	19.5	19.2

Source: Derived from data provided by the Defense Manpower Data Center.

Table 2.   Number and Percentage of Women Among
             New Recruits for Selected Marine Corps
             Cohorts, 1981-1994

Selected Cohort (Year of Entry)	Number of Women	Women as Percentage of Recruits
1981	2,236	5.7
1985	2,134	6.4
1988	2,038	6.0
1989	2,061	6.4
1990	1,721	5.4
1991	1,557	5.5

Table 2 (Continued)

Selected Cohort (Year of Entry)	Number of Women	Women as Percentage of Recruits
1992	1,595	5.0
1993	1,595	4.6
1994	1,720	5.4

Source: Derived from data provided by the Defense Manpower Data Center.

EDUCATION

Women, on average, tend to have a higher level of education than do their male counterparts. In the 1991 cohort, for example, no women were accessed who did not possess a high school diploma. The percentages of high school graduates for men and women are nearly similar, as seen in Table 3. The greatest disparity lies in education levels above high school for men and women, as seen in Table 3. For instance, 3.5 percent of all female recruits from the 1991 cohort have either some college or a college degree as compared with just over 1 percent of men.

Table 3. Percentage Distribution of New Recruits by Education at Entry and Gender, USMC 1991 Cohort

Education at Entry	Percent of Men	Percent of Women
Non-Graduate	0.2	0.0
High School Equivalent	4.2	1.4
High School Graduate	94.4	94.9
Some College	0.5	2.0
College Graduate	0.6	1.5
Total	100.0	100.0

Source: Derived from data provided by the Defense Manpower Data Center.

MARITAL STATUS

Of all enlistees in fiscal year 1991, 33.2 percent of men and 42.0 percent of women are married. Table 4 shows the comparative figures of men's and women's attrition with respect to marriage. As can be seen, these data suggest that being a married man greatly diminishes one's likelihood of attriting. Also, for all attrition other than pregnancy, being a married female seems to greatly diminish one's likelihood of attriting. At the same time, being a married female appears to greatly increase the probability of attrition due to pregnancy.

Table 4.   Percentage of Non-Attrites and Attrites who are Married, by Gender, USMC 1991 Cohort

	Male		Female		
	Non-Attrite	Attrite	Non-Attrite	Attrite Other than Pregnancy	Pregnancy Attrite
Percent Married	41.1	16.6	53.7	16.0	62.1

Source: Derived from data provided by the Defense Manpower Data Center.

The relation between marital status and pregnancy is similar in the Navy. Thomas and Edwards [Ref. 52], for example, state that 63.5 percent of all women sailors were either married when they became pregnant or got married while they were pregnant.

TRADITIONALITY

There are two primary means of measuring the so-called "traditionality" of a woman in the Marine Corps. The two types are as follows:

Attitudinal Traditionality

A woman's attitudinal commitment [Ref. 50] can be measured as a function of her desire for a "traditional" female role in life. That is, how strong is her inclination to be a mother? Or, does she see herself as a housewife or a career woman in five years? [Ref. 19] Since surveys are necessary to derive this type of traditionality rating, only the results of past research can be used in the present study.

Occupational Traditionality

As explained in the variable definition section of Chapter III, traditionality can also be measured as a function of a person's occupation [Ref. 51].

When all MOSs are included in the observations, women represented 5.5 percent of 1991 accessions. It is important to note here that women are excluded from nearly one-quarter of all Marine Corps occupations, namely those in the combat arms. By excluding combat-arms MOSs from the data set, a more accurate representation level is achieved. Given this method, women represented 7.5 percent of all Marines from the 1991 cohort in available or "non-excluded" jobs.

Table 5 shows the proportions of men and women from the 1991 cohort by the traditional or non-traditional (for their gender) description of their occupational

Table 5.   **Percentage Distribution of Enlisted Personnel by Occupational Traditionality (Male, Female, or Both), USMC 1991 Cohort**

Gender	Total Population	Traditionally Female	Traditionally Male	Either Male or Female
Men	92.5	83.7	97.4	93.3
Women	7.5	16.3	2.6	6.7
Both	100.0	100.0	100.0	100.0

Source: Derived from data provided by the Defense Manpower Data Center.
Note: Representation levels were determined from only those occupations that were available to female Marines.

speciality. As seen here, women were overrepresented in the traditionally-female occupations. At the same time, they were underrepresented in the traditionally-male occupations and in occupations defined as either "male" or "female."

ATTRITION

Table 6 shows first-term attrition rates by gender for each of the six cohorts. As expected, female attrition was higher than male attrition for each of the cohorts examined in the thesis.

However, some of the prior research was not supported by the data. Quester and Steadman [Ref. 12], for example, claimed that "if pregnancy/parenthood separations are ignored, the first-term attrition rates of male and female Marines are very similar." When pregnancy attrites were pulled from the sample of women in the 1991 cohort, the female attrition rate (45.4 percent) was still somewhat higher than the male attrition rate (32.4 percent).

As seen in Table 7, the first-term attrition rate of men who entered the Marine Corps in 1988 was similar to that of men who entered the Navy in the same year. This similarity is not true for women. In fact, the attrition rate of women who entered the Navy in 1988 (38.4 percent) was considerably less than the rate of those who enlisted in the Marine Corps (57.5 percent). Pregnancy attrition rates were likewise higher for Marine Corps women (19.2) than for Navy women (11.0 percent). This outcome is not particularly surprising since Marine Corps attrition has been historically higher than in the other services [Ref. 54].

Table 6.   Attrition Rate (Percent) by Gender, Selected USMC Cohorts, 1981-1991

Year of Entry	Male	Female			Total
		Pregnancy	Non-Pregnancy	All	
1981	31.5	15.7	28.0	41.2	32.0
1985	29.2	17.3	31.1	44.1	30.1
1988	33.5	19.2	47.0	57.5	34.9
1989	34.9	15.3	49.8	57.8	36.4
1990	39.0	14.2	50.1	57.6	40.0
1991	32.4	13.2	45.4	54.1	33.6

Source: Derived from data provided by the Defense Manpower Data Center.

Table 7.   Navy and Marine Corps Attrition Rates (Percent) by Gender, 1988 Cohorts

Service	Male	Female			Total
		Pregnancy	Non-Pregnancy	All	
Navy	33.4	11.0	30.6	38.4	34.0
Marine Corps	33.5	19.2	47.0	57.5	34.9

Source: Derived from data provided by the Defense Manpower Data Center.

ENTRY AGE VERSUS ATTRITION

As seen in Table 8, frequency analysis was inconclusive concerning any relationship between entry age and attrition. Previous research [Ref. 3] has

determined that such a relationship should exist. However, no definitive pattern presents itself when the attrition rates for each "age at entry" are examined.

PREGNANCY ATTRITION

Table 9 shows the pregnancy attrition rate for each fiscal year used in this research. It is interesting to note that, as the number of female accessions fell (see Table 2), the pregnancy attrition rate declined, but just modestly, from 19.2 percent among 1988 entrants to 13.2 percent for those who entered in 1991.

Table 8. **Attrition Rate (Percent) by Age at Entry and Gender, USMC 1991 Cohort**

Age at Entry (Years)	Female	Male	Total
17	45.0	31.5	32.6
18	48.9	29.2	30.4
19	56.7	33.0	34.0
20	56.5	35.6	36.6
21	56.3	36.5	37.8
22	59.4	34.3	36.0
23	45.2	37.1	38.3
24	56.5	37.2	38.4
25	45.5	44.6	44.7
26	47.6	46.0	46.2
27	35.7	41.6	40.9
28	70.0	35.4	39.3
All Ages	52.2	32.4	33.6

Source: Derived from data provided by the Defense Manpower Data Center.

Table 9.   Pregnancy Attrition Rate (Percent) by Selected USMC Cohort, 1981-1991

Year of Entry	Pregnancy Attrition Rate (Percent)
1981	15.7
1985	17.3
1988	19.2
1989	15.3
1990	14.2
1991	13.2

Source: Derived from data provided by the Defense Manpower Data Center.

A comparison of Navy and Marine Corps pregnancy attrition (Table 10) among female entrants during fiscal year 1988 shows a significantly higher rate among women Marines. Prior research has shown that the Marine Corps historically experiences higher rates of attrition than does the Navy [Ref. 54]. Therefore, this gap is not unexpected.

Table 10.   Navy and Marine Corps Attrition Rates (Percent) for Women Recruits, 1988 Cohorts

Service	Total Number of Women	Pregnancy Attrites	Pregnancy Attrition Rate (Percent)
Navy	2,038	391	19.2
Marine Corps	8,863	975	11.0

Source: Derived from data provided by the Defense Manpower Data Center.

CIVILIAN PREGNANCY-RELATED TRENDS

General

Civilian pregnancy trends provide a context with which to view trends in the Marine Corps. Without this context, it is difficult to determine whether the current Marine Corps rates should be considered high, "normal," or less than expected. The assessment of civilian trends also provides a "base-case" with which to compare women Marines and civilian women who have similar demographic characteristics.

Live Births

U.S. Census Bureau statistics [Ref. 22] show that the overall rate of births is increasing nationwide. Table 11 shows birth rates for the age groups that account for the majority of Marine Corps recruits. It should be noted that the civilian rates are not directly comparable to those of the Marine Corps. U.S. Census Bureau data are derived from actual live-births, and Marine Corps data are derived from pregnancy discharges. It seems reasonable to assume that some of the women discharged for pregnancy may have opted for abortion or experienced a miscarriage rather than a live birth. Therefore, the Marine Corps' live birth rates are likely lower than these estimates. However, there is no accurate way to estimate how many of these pregnancy discharges were not carried to term. Given this context, the analysis of live births versus pregnancy discharges does provide the best available comparison.

Table 11. Change in Live-Birth Rates Between 1988 and 1990 Among Selected Civilian Population Age-Groups (per 1,000 women)

Year	Age-Group (Years)		
	18-19	20-24	25-29
1988	113.1	116.1	110.8
1990	128.0	124.1	113.0
Increase	+13.2%	+6.8%	+1.9%

Source: U.S. Census Bureau.

Out-of-Wedlock Births

In addition to an increase in birth rates across the board, the Census Bureau also reports that the rate of out-of-wedlock births in the United States is on the rise [Ref. 37]. Table 12 shows the 1991 civilian rates for out-of-wedlock births, by age group, compared with the Marine Corps "combined" cohort rate. A combination of all cohorts was needed since the Marine Corps does not report a sufficient number of out-of-wedlock births in any given year from which to form credible statistical analysis. For example, in 1991, the Marine Corps only reported 20 out-of-wedlock pregnancies among 20-24 year-old women and 2 among those aged 25-29. No credible statistical results can be drawn from such small numbers of observations. Consequently, all six of the Marine Corps cohorts were combined to form the largest possible sample.

Table 12.   Civilian and Marine Corps Out-of-Wedlock Birth Rates by Age Group of Mother (Per 1,000 Unmarried Women)

	Age Group (Years)			
	20-24		25-29	
	Civilian	Marine Corps	Civilian	Marine Corps
Estimated Births	68.0	64.7	56.5	31.8

Source: Derived from data provided by the Defense Manpower Data Center and U.S. Census Bureau.

This comparison suggests that the Marine Corps is experiencing lower rates of out-of-wedlock births than in the general population. In addition, the difference appears to widen among older women: the Marine Corps rate was 3.3 percentage

points lower among women aged 20-24 and 24.7 percentage points lower among those between the ages of 25 and 29.

Increase in Out-of-Wedlock Births

The U.S. out-of-wedlock birth rate, as with the overall birth rate, is rising rapidly (Table 13). An accurate Marine Corps comparison is not available, due to the relatively small number, even with combined cohorts, of out-of-wedlock pregnancies. As such, it is best to observe the civilian data and expect that some of the same trends are experienced to some degree within the Marine Corps. The Marine Corps recruits just a small subset of women from the general population--limited by certain quality factors (such as education and aptitude) as well as propensity to serve--but many social trends are often reflected in the military.

Table 13. Changes in Civilian Out-of-Wedlock Birth Rates Between 1980 and 1991 (percent)

	Age Group (Years)	
	20-24	**25-29**
Percentage Increase	+80.9	+135.6

Source: U.S. Census Bureau.

Offsetting Marriage

One trend that might contribute to the rising rate of out-of-wedlock pregnancies is that women are marrying later. A Census Bureau statistical brief [Ref. 37] states the following:

> In 1994, the median age at which women married for the first time was 24.5. Just a generation ago, in 1970, they were only 20.8 years of age when they first married. This change provides nearly four additional

years for a young woman to be vulnerable to pregnancy prior to marriage. As a by-product of this increased exposure time, about 26 percent of babies born in 1994 were born out of wedlock.

Single Parenthood

Even if a woman Marine does become a single-mother, she will not be alone among her civilian contemporaries. As seen in Table 14, 13 percent of women who have never been married have at least one child [Ref. 26].

Table 14.   Never-Married U.S. Women by Age-Group and
           Number of Children

Age Group	Percent Who Have One Child	Percent Who Have Two or More Children
20-24	13	7
25-29	13	17

Source: U.S. Census Bureau.

INTENTIONALITY OF MARINE CORPS PREGNANCIES

One question that should be addressed in this thesis is whether Marine Corps pregnancies are occurring intentionally or otherwise. An analysis of overall U.S. births would suggest that many of them are, in fact, "unintended." The sheer percentage of young women who get pregnant in the U.S. civilian community serve to suggest that female Marines are merely reflecting the same pregnancy rates as women in general. Jurmain and Loughlin [Ref. 31] quote the National Center for Health Statistics as claiming that "half [of all U.S. women] have a pregnancy by [age] 21." Given the fact that nearly 87 percent of all women Marines are recruited at age

21 or younger, it seems reasonable to expect that a large portion of them will become pregnant during their first enlistment.

Gerrard [Ref. 20] states that "pregnancy rates for Marine Corps women are equal to those of other women their age." She goes on to say that, "although pregnancy accounts for a majority of the difference in attrition between men and women, results do not support the hypothesis that many women are becoming pregnant in order to be discharged."

Further evidence is provided by exit-survey research. Kerce and Royle [Ref. 19] found that, among women being discharged for pregnancy, only 10 percent expressed the desire to leave the Marine Corps. The remaining 90 percent would have chosen to remain in the Marine Corps if the job requirements would have been more conducive to their needs as a working mother.

Kost and Forrest [Ref. 26] claim that "of all (U.S.) births in 1988, 36 percent were mistimed and 7 percent were unwanted." This adds up to a 6-percent increase from the 37 percent level of unintended births that existed in 1979. Lee [Ref. 24] argues that the rate is even higher by reporting that "3.5 million unintended pregnancies occur annually. This figure is more than half of all pregnancies in the United States." In testimony before the U.S. Senate [Ref. 21], former Surgeon General Joycelyn Elders argued that the figure was even higher among teenagers by claiming that "4 out of 5 (teen pregnancies) are unintended."

Table 15 shows an age-group breakdown of the national unintended pregnancy figures. As can be seen, age is a significant contributor to a woman's chance of experiencing an unwanted pregnancy. Although younger women account for fewer births, their chances of having an unintended pregnancy are much higher.

Unplanned pregnancies are prevalent in the Navy also. Thomas and Edwards [Ref. 52] state that 60 percent of all women sailors who become pregnant tend to do

so unintentionally. Additionally, lower-ranking women tend to have higher rates of unintended pregnancies.

Table 15.   Percentage of U.S. Live Births From an
              Unintended Pregnancy by Age-Group, 1993

Age Group	Unintended Pregnancy (Percent)
18-19	68
20-24	50
25-29	34

Source: U.S. Census Bureau.

Sexual Activity. Nelson [Ref. 33] reports that "a study of [Navy] women on an un-named submarine tender and supporting shore personnel shows, even though the women seemed knowledgeable about the risks of unprotected sex: roughly a third had more than one sex partner in the past six months. Less than half of that third had partners who always used condoms."

Gerrard [Ref. 20] claims that the incidence of sexual involvement among female Marines shows a population that is also sexually active:

> As a group, the women entered the Marine Corps with a significant amount of sexual experience. Eighty-five percent had engaged in sexual intercourse, ...with the non-virgins reporting an average of 5.7 sexual partners. The sexually experienced women reported having intercourse an average of 8.9 times per month in the 3 months immediately preceding recruit training. Twenty-three percent reported having previously experiencing at least one pregnancy, ...and five percent had been pregnant more than once.

If these levels of reported sexual activity are accurate, the pregnancy rates that the Marine Corps is experiencing seem to match what is expected.

Months to Attrition. As seen in Table 16, pregnancy attrites remained in the Marine Corps almost two years, on average, before they were discharged. The average length of service before pregnancy tends to suggest that most of the women are not using pregnancy as a means of getting a quick discharge from the Marine Corps. There is no way of determining from these data the number of women who may simply be seeking a way to get out of the Marine Corps; but since a large proportion of attrition tends to occur soon after enlistment, it is assumed that women who want to separate from the Marine Corps could find another way to do it earlier in their term of service. If that were, in fact, true, the average months to pregnancy attrition would be much lower.

Table 16.   Average Months of Active Duty Before Attriting
From the Marine Corps by Gender and Pregnancy,
USMC 1991 Cohort

	Male	Female	
		Pregnancy	Non-Pregnancy
Average Number of Months	14.9	22.1	13.3

Source: Derived from data provided by the Defense Manpower Data Center.

V. MULTIVARIATE REGRESSION ANALYSIS

As observed in Chapter I, regression models are useful in predicting causation relationships among selected demographic variables. Since the primary research question of this thesis requires the identification of such relationships, these models are important to the study.

Previous research on attrition was used to form a nucleus of variables that have shown relationships with attrition. Additional variables were then added to examine the effects of occupational traditionality. Once the basic model was formulated, three separate population groups were tested and comparisons were drawn from the results. These three models were attrition in the total population, attrition in the female population, and pregnancy attrition. The results of these three models are discussed below.

1. Total-Population Model

A logistic model was conducted with the entire FY 1991 cohort to establish a baseline for Marine Corps attrition. The base or comparison group for this initial model was a white, male, high school graduate who had between 4-6 months of time in the DEP and worked in a job that was neither traditionally-male nor traditionally-female. All coefficients are expressed in relation to this base group.

The dependent variable for this initial model was the dichotomous variable ATTRITE. The definition for "attrite" was discussed in Chapter III.

Only the significant variables for this total-population model are shown in Table 17. Appendix A shows the results of the entire model. Eighteen of the twenty-one variables in the model were significant for the total-population model. A negative sign indicates that this characteristic leads to a reduced chance of attrition. A positive sign indicates an increased chance of attrition. Each variable is not

discussed in detail, since pregnancy attrition, not total attrition, is the focus of the thesis. However, there are a few points that should be addressed. The results that bear further attention are:

Table 17.   1991 USMC Cohort Total Population Model:
Significant Variables Only

+FEMALE	-OTHR_MIN	+ENTR_AGE	-HISPANIC
-AFQT_PCT	+NON_GRAD	+HS_EQUIV	-SUMCOLGE
-COL_GRAD	+WAIVED	+DEP_ONE	-DEP_TRE
-DEP_FOR	-ALT_MOS	-MARRIED	-ALL_MALE
-TRAD_FEM	-NON_TRAD		

Source: Derived from data provided by the Defense Manpower Data Center.

(1) **FEMALE.**   As the attrition rates suggest, being a woman increases the likelihood of leaving the Marine Corps before completing a first-term of service. This outcome validates the results of the model to some extent, since it is a fundamental finding of previous research.

(2) **SUMCOLGE.** If a person had some college, (more than none and less than a Bachelor's Degree), their probability of attriting was lowered.

(3) **DEP_NON.** One variable that is insignificant is DEP_NON. This category consists of all Marines enlisted in 1991 who did not participate in the delayed entry program (DEP). DEP_NON was left in the model because previous research [Refs. 6 and 43] suggests that not participating in DEP results in a positive, significant coefficient. In 1991, this variable may have been insignificant simply because of the small number of accessions who do not participate in the DEP. In 1991, out of 28,117 total accessions, only 557 did not enlist through the DEP.

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(4) **Occupational Traditionality**. Both of the occupational traditionality variables (TRAD_FEM and NON_TRAD) are significant and negative. What this means is that persons in either one of these occupational groups is less likely to attrite than an otherwise similar person in the EITHR_OR group.

(5) **MARRIED**. If a Marine is married, either upon entering the Marine Corps or during his or her enlistment, their chances of attriting are reduced.

2.   Female-Population Model

Another model was constructed to analyze the same demographic relationships as in the total-population model, but with respect to female attrition. The base model, or comparison group, for the female-population model is a white, female, high school graduate who had between 4-6 months of DEP and worked in a job that is neither traditionally-male nor traditionally-female. All coefficients are in relation to this base group. The dependent variable remained ATTRITE as with the general population model. The significant variables of that logistic regression are shown below in Table 18. Appendix B shows the results of the entire model.

Table 18.   1991 USMC Cohort Female-Only Model: Significant Variables Only

-BLACK	-HISPANIC	-AFQT_PCT	+COL_GRAD	ALT_MOS
-DEP_ONE	-MARRIED	-TRAD_FEM	-NON_TRAD	

Source: Derived from data provided by the Defense Manpower Data Center.

As seen in Table 18, only 9 variables, or half of the number of those significant in the general-population model, remain significant in the female-population model. These relatively few causation factors are consistent with the results of

research on female attrition [Ref. 47]. As with the general model, only those variables deemed relevant to upcoming results are discussed below:

(1) **DEP_NON**. Non-participation in the delayed entry program remained insignificant in the female-population model.

(2) **Occupational Traditionality**. Both occupational traditionality variables remain significant and negative. This outcome is consistent with prior research. Waite and Berryman [Ref. 39] for example, write that their "hypothesis that job turnover of women is negatively related to the sex typicality of their occupation is not supported by our findings...."

(3) **MARRIED**. Married-at-entry remained negative for the all-female model. Thus, being a married woman Marine decreases the likelihood of attrition. This outcome corresponds with the findings of the cross-tabulation analysis.

(4) **Entry-Age Comparisons**. Initially, it appeared suspicious that age at entry was not significant for women entering the Marine Corps in fiscal year 1991, since this finding is contrary to previous research [Ref. 11]. What this outcome predicts is that age at entry is irrelevant in factoring for attrition among the fiscal year 1991 woman Marines. In fact, further research uncovered that entry age was irrelevant in all six years studied.

3.   **Pregnancy Attrition Model**

The same female-only model was used to measure the effect of the same demographic variables with pregnancy as the dependent variable. All men were struck from the observation since, through frequency analysis, it was discovered that some men are inadvertently given a pregnancy separation code.

The base model, or comparison group, for the pregnancy attrition model remained a white, female, high school graduate who had between 4-6 months of DEP

and worked in a job that was neither traditionally-male nor traditionally-female. All coefficients are in relation to this base group.

The dependent variable is now PREGNANT as defined earlier in Chapter III. The significant variables of the pregnancy attrition model are shown below in Table 19.

Some interesting comparisons with the other two models arise from the pregnancy attrition model results. Only three variables remain significant in the pregnancy attrition model, but these three coefficients all disagree with results of the other models (Table 20). Appendix C shows the results of the entire model.

Table 19. 1991 USMC Cohort Pregnancy Model: Significant Variables Only

+SUMCOLGE	+MARRIED	+ENTR_AGE

Source: Derived from data provided by the Defense Manpower Data Center.

Table 20. Comparison of Significant Variables in the Pregnancy-Attrition, Female Population, and General Population Models

Variable	Model		
	Pregnancy Attrition	Female-Population	Total-Population
SUMCOLGE	+	Insig	-
MARRIED	+	-	-
ENTR_AGE	-	Insig	+

Source: Derived from data provided by the Defense Manpower Data Center.

SUMMARY

The above results suggest the following conclusions in terms of developing screening policies to deal with pregnancy attrition:

(1)   Increasing the number of accessions with SUMCOLGE will likely have a negligible effect on female attrition, decrease attrition in the total population model, and increase the pregnancy attrition rate.

(2)   Increasing the number of accessions who are MARRIED will decrease female attrition, as well as total population attrition, and increase the pregnancy attrition rate.

(3)   Increasing the average ENTR_AGE will likely have no effect on female attrition, increase attrition in the total population, and decrease the pregnancy attrition rate.

VI. POLICY ALTERNATIVES

There are three distinct policy approaches to deal with pregnancy attrition in the Marine Corps. They are: enlistment screening, intervention, and management.

ENLISTMENT SCREENING

The modeling outcomes presented in Chapter V are somewhat of a blessing in disguise. For two reasons, it would be extremely difficult to screen out women who may have a higher propensity to become pregnant while in their initial enlistment. First, no tangible demographic characteristic with enough statistical significance has been found to be an effective screening predictor. It is true that women who are relatively older are less likely to have an unwanted pregnancy [Ref. 26], and women who are married have a higher chance of becoming pregnant, but there would be only small potential gains from screening out women in these categories. Prior research suggests that a woman's psychological traditionality greatly affects her likelihood of becoming pregnant [Ref. 32], but the costs of accurately determining this level of traditionality somewhere in the recruitment cycle would likely exceed the benefits. Second, even if a successful pregnancy predictor could be identified, screening for such a characteristic could become a politically-charged issue that would probably be challenged on several grounds. All currently-accepted screening criteria are based upon some type of objective, concrete measure such as test performance, level of education, arrest record, physical or medical condition, and so on. In the societal climate of today, using the possibility of becoming pregnant as an enlistment criterion is simply not practical.

And even if "traditionally-minded" women could be identified and screened out, the proportion with respect to all women must be at or above 50 percent. The recruiting market would never be able to survive such a screening process.

INTERVENTION

The main objective of any intervention policy would be to encourage women to delay pregnancy until their first-term obligation has been completed. A great deal of previous research exists that supports the potential success of such a policy. Royle [Ref. 46], for example, suggests that "an effective...program to reduce unplanned pregnancies could have a major impact on the incidence of pregnancy among first-term women."

In a 1995 pregnancy-education study conducted in Philadelphia [Ref. 23], the authors state that

> ...it is widely believed that U.S. adolescents are capable of engaging in responsible sexual decision-making...based in part on the experiences of other developed nations--where rates of pregnancies...are markedly lower, even when levels of...sexual activity are relatively high.

Education is the primary approach to intervention. Martin and Jaurez [Ref. 28] claim that "education has long been recognized as a crucial factor in influencing women's childbearing patterns." They go on to make the argument that delaying pregnancy through education "raises the opportunity costs of (bearing) children by enhancing women's opportunities to pursue wage-earning activities." Given this evidence, it is reasonable to expect that a successful education strategy could be implemented that addresses the economic impact of pregnancy. Census Bureau statistics [Ref. 37] from 1995 show that a women with a high school diploma made only $19,168 while their male counterparts earned $26,820. Given this disparity in the civilian sector, and the relative parity of female-male compensation within the Marine Corps, the obvious economic choice for a female is to remain in the Marine Corps.

Much like general education, information on contraception is a proven winner in any effort to offset the pregnancy rate. Lee [Ref. 24] states that "because pregnancy is so expensive, all available contraceptive methods are extremely cost-effective." In a 1995 study [Ref. 27] on the effects of a contraception program in Baltimore, the authors report that the "pregnancy rate in the intervention area significantly decreased from an annual average of 77 pregnancies per 1,000...to 37 per 1,000. Additional proof that it was the contraception program and not just an aberration is that "the pregnancy rate returned to a higher level (66 per 1,000)...after the discontinuation of important program components...."

Royle [Ref. 46] provides the following analysis on the effects of contraceptive education:

> The most effective programs incorporate many factors in addition to providing contraceptive information. These factors included developing motivation to use contraception and improving access to contraceptives. Also important are providing instruction, practice, and skill-building in decision-making, assertiveness, communications, and other social skills necessary to negotiate abstinence or contraceptive use, and changing the peer-group climate to support and reinforce such behaviors.

MANAGEMENT

Management of pregnancy attrition in the Marine Corps may take several forms. Three possible approaches would be reducing female accessions, maintaining the status quo, and discouraging the pregnancy-equals-discharge atmosphere.

1. **Reduce Female Accessions**

Regardless of the number of women recruited annually into the Marine Corps, there will always be a number of pregnancy-related discharges. Therefore, an immediate means of reducing the number of pregnancy attritions is to recruit fewer

women. Doing so provides immediate savings in recruiting, training, and outprocessing; but, it is clearly impractical and undesirable, given the Marine Corps' objective of increasing gender diversity.

2. Maintain the Status Quo

Despite all perceptions, the Marine Corps is not experiencing pregnancy attrition rates that are out of line with the demographic characteristics of the female population. Additionally, the number of women who attrite due to pregnancy, as a percentage of women enlisted, has been dropping steadily for at least the past fifteen years. Maintaining the status quo, however, is acceptance of relatively high personnel turnover and its related costs as well as a situation that can likely be improved.

3. Continue to Abolish the Pregnancy-Equals-Discharge Perception

This alternative is offered even with the realization that both the Department of Navy and Headquarters Marine Corps have recently updated their pregnancy policies [Ref. 30], for there is some question as to whether these "new" policies are not just "more of the same." In a March 1995 ALMAR [Ref. 45], statements such as "this is not a change from current Marine Corps policy" would lead to an understanding that, indeed, nothing has changed.

A November 1995 Navy Times article [Ref. 29] quotes a Headquarters Marine Corps Manpower Planner as saying "[pregnancy] wasn't an automatic out, per se. But it was perceived that way." And it apparently still is perceived that way. Despite voicing some desire to reduce the outflow of pregnant women, Headquarters, Marine Corps has not yet dispelled Commanders of the perception that discharge is no longer a matter of choice for women who become pregnant.

4. Related Concerns

Fears of Increased Abortion

There seems to be some concern that requiring pregnant Marines to complete their obligated service would somehow increase the rate of abortion among these women. Depending upon the source of information, there is evidence to either support or allay this concern [Refs. 25 and 34]. In any case, most evidence is still grounded largely in speculation.

Despite any Marine Corps policy changes, the incidence of abortion is already extremely high. Table 21 shows the 1993 abortion rates in the United States. Abortions range from 1 out of every 5 to 1 out of every 3 pregnancies based on whether the pregnancy was intentional or not.

Table 21. Abortion Rate (Percent) in the U.S. by Age Group, Total Pregnancies, and Unwanted Pregnancies, 1993

Age Group	Unwanted Pregnancies	Total Pregnancies
20-24	33.0	29.3
25-29	22.0	19.1

Source: Unwanted pregnancy data taken from Ref. 26 and total pregnancy data taken from Ref. 27.

Department of Defense policy currently discourages abortions by not providing health coverage for service members' abortions. Pentagon funds cannot be used to pay for abortions, but service members can use private funds to pay for them.

Much like predicting pregnancy, predicting who will get an abortion and what will cause her to make that decision is hard to determine. Kost and Forrest

state that "among women who had an unintended pregnancy, those who induced abortion and those who gave birth differed in few ways." [Ref. 26]

Eliminating the pregnancy-equals-discharge atmosphere, however, could actually reduce abortions among female Marines. First, for the small percentage of women who do intentionally become pregnant for the purpose of receiving a discharge, discouraging this atmosphere will remove the pregnancy option as a way out. Second, for the women who do become pregnant unintentionally, yet desire to remain in the Marine Corps, ending this atmosphere will remove the conflict that currently exists between motherhood and the Corps. If, in fact, life as a Marine and a mother do become compatible, the trade-off of career versus baby will be removed.

Single-Parent Issues

Single-parenthood is widespread in this nation. Currently, 30 percent of the U.S. population have only one parent in the household [Ref. 22]. The major difference between civilian single-parents and Marine single-parents is that Marines must state that they will "remain worldwide assignable" and "craft a family care plan in case they deploy" [Ref. 29]. This difference is fully acceptable since, upon enlisting in the Marine Corps, this "assignability" obligation is in effect for parents and non-parents, men and women alike.

Thomas and Thomas [Ref. 41] claim that male Marines with dependents experience fewer disciplinary problems and have higher retention rates than their otherwise equally-qualified peers. A labor market assumption could be made that the same would hold true of women with dependents. The authors continue by stating that "hourly absences of women and men generally do not differ significantly, even when pregnancy and convalescent leave are included as sources of lost time. Single parents did not have significantly more lost time than married parents."

Navy studies to date have shown that, while women lose more time than do men because of medical reasons, including pregnancy, men lose more days overall because they experience higher rates of disciplinary incarceration [Refs. 35, 53]. Furthermore, whether these women remain on active duty or become civilians, they will most likely participate in the labor market. Of the 4 million U.S. women who gave birth in 1993, 53 percent were back in the labor force in 1994 [Ref. 37]. As education levels rise, the incidence of returning to work also increases. Since almost all female Marines have graduated from high school, their inclusion in this group is appropriate. Leibowitz and Bowe [Ref. 40] claim that "currently, more than half of all women [have returned to] the labor force before their youngest child reaches one year of age." The study also finds that, without any kind of coercion, other than the need to make a living, "many women interrupt work for only short periods of time as a result of childbirth." During the last three decades, the "working mother" has become the rule rather than the exception. In 1960, fewer than one in five (18.6 percent) mothers with children under six were in the labor force. By 1987, this percentage had tripled, reaching 57 percent [Ref. 40].

VII. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

SUMMARY

The Commandant of the Marine Corps, General Chuck Krulak, stated in his planning guidance [Ref. 38] that "in the long history of conflict, we have learned that battles are more often won or lost in the minds of the commanders." This same observation can be applied with respect to the Marine Corps' ongoing "battle" with attrition.

Attrition rates have hovered at around 30 percent since the inception of the All-Volunteer Force in 1973 [Ref. 1]. Regardless of what approach the Marine Corps has taken to screen new enlistees, including vastly improved controls over the "quality" of recruits, and regardless of the vagaries of the national economy, this constant level of early loss suggests that attrition rates are, in fact, the result of a "self-fulfilling prophecy" rather than the work of the natural forces of nature. The argument could be made that Marine Commanders know, from historical trends, that they can discharge a third of their male Marines and half of their female Marines per month/quarter/year. Consequently, they may adjust their discharge recommendations accordingly to meet the "allowable quota." In reality, then, attrition is viewed as a tool of quality control rather than the burdensome nemesis that manpower planners portray it to be. Whether this assumption is true or not for Marine Corps attrition, as a whole, it is certainly true for pregnancy attrition. All attrition due to pregnancy is a conscious decision on behalf of the Marine Corps to dissolve the expectant mother's contract of obligated service. Pregnancy attrition is, in essence, entirely "Marine Corps-generated." Women conceive the child, but it is the Marine Corps that conceives the discharge.

CONCLUSIONS

Pregnancy attrition within the Marine Corps is by no means a "raging wildfire." Waite and Berryman [Ref. 39] contend that "clearly, the military is relatively successful in controlling turnover of women...through its selection, training, service contract, and other human-resource policies." Their research results show that, for similar demographic characteristics, the Armed Forces experience only half the turnover as do their civilian counterparts. Finally, they report that there is "no effect of service in the Marine Corps on turnover. In fact, no branch of service appears better or worse than any other in its retention of women."

In recent history, pregnancy in the Marine Corps was not a problem, and it was not an issue. It was a dilemma. A "dilemma" is defined as any situation where two equally unfavorable choices are all that is available. The Marine Corps' two choices were to discharge the pregnant Marine or retain her as a working mother. These two choices still remain, but discharge is no longer the solution of default and retention is no longer the "lesser of two evils."

RECOMMENDATIONS

Four alternative categories have been researched and addressed. They are: recruit screening, education, human relations, and reducing pregnant-Marine outflows.

Screening

Practical indicators of a woman's propensity to become pregnant and leave the Marine Corps prematurely are not available through traditional methods of demographic research. In addition, the costs of obtaining this information through survey research make the effort prohibitive.

Additionally, it is easy to say, from the bastions of academic sterility, that "women with extremely traditional career orientations should not be enlisted" [Ref.

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18]--but the realities of both societal and labor market demands rule out such alternatives.

The demographic variables that were identified as significant in predicting pregnancy (SUMCOLGE, ENTR_AGE, and MARRIED) were inversely related to the general population's attrition levels. If different recruitment policies could be implemented for men and women, a difficult task in itself, meager benefits could be realized from targeting these specific demographic characteristics. From a recruiting standpoint, this means that recruiting fewer women who are age 19 and under and more women between the ages of 20 and 24 would reduce pregnancy attrition. Setting the target any older would greatly reduce the positive effect.

It seems reasonable to conclude that screening will not achieve the Marine Corps' needs with respect to pregnancy attrition. As such, the focus of attention must necessarily center on delaying pregnancies until after the first enlistment is completed and applying appropriate manpower management policies for those women who do become pregnant.

Education

Martin and Juarez conclude that "the accumulated evidence provides a compelling rationale for focusing on increased investment in education" [Ref. 28]. Although the Marine Corps' new pregnancy directive [Ref. 45] provides that "advice concerning personnel decisions, including the issues of faith, character, parental responsibilities, individual core values, and medical concerns, will be readily available to those who seek it," this method is far too passive to achieve the Marine Corps' goals. The language of the policy is written as if the pregnancies were occurring among women who were planning to have a child. Available evidence concerning this issue indicates that most of these pregnancies are unplanned. The precise wording in the policy is that "advice and counseling will be made available

to those who seek it." The main problem with such a strategy is that the risk of becoming pregnant must already be a conscious concern to the Marine before the policy becomes relevant.

In a Philadelphia study on pregnancy-avoidance [Ref. 23], it was discovered that the overall pregnancy rate for the city was not reduced during the program's education phase, but the pregnancy rate of those who chose to participate did decline. Some of this benefit can certainly be attributed to the self-selection principle, but all of the results cannot be discounted as only effective for women who initiate the educational process themselves. The reason that the average rate throughout Philadelphia did not fall is that most women were not even exposed to the program's message of education and contraception.

As such, the Marine Corps needs a comprehensive pregnancy educational process implemented outside the confines of Recruit Training. This policy should be mandated and not voluntary. Additionally, for obvious reasons, both sexes should be required to participate. Royle and Thomas [Ref. 46] list specific topics that should be addressed in such a program:

> Provide an individualized discussion of the risks of pregnancy...and contraceptive alternatives as part of all routine...physical examinations for men and women. Expand the scope of the sexuality curriculum...to include assertiveness and skills in communications, decision-making, and resistance to negative peer pressure.

Human Relations

Get the Word Out. "The Marine Corps prefers that women postpone pregnancy until the end of your initial obligation; but if a female does become pregnant, the Corps will attempt to accommodate her. Pregnancy and working mothers are, indeed, compatible with active duty in the Marine Corps." If that

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message is not true, the Marine Corps will experience continuing difficulty in achieving its goal of 6-percent female representation in the career force.

Educate the Marine Corps' Leaders. Most Marine pregnancies are not malicious attempts to receive an early discharge. The Secretary of the Navy was correct when he said: "Pregnancy is a natural event that can occur in the lives of Navy and Marine Corps servicewomen." [Ref. 35] These points must be widely disseminated and respected as valid before the spirit and intent of the new pregnancy directive can be carried out.

Continue to Abolish the Pregnancy-Equals-Discharge Perception

The biggest, and most immediate, gain in solving the pregnancy attrition issue may lie in simply not allowing pregnant Marines to leave the service until the end of their obligation. However, inherent in this policy is the decision to accommodate maternity leave requests and working mothers. But, it does not take a statistician to figure out that pregnancy discharges and female representation are inversely related--for one to grow, the other must shrink. Although steps have been taken to address this issue [Refs. 34, 36, 44, and 45], retention for pregnancy must become more than the official written policy. It must become the norm rather than the exception.

With all of the evidence pointing to the very high likelihood that an individual female Marine will become pregnant at some time during her enlistment, it seems almost inconceivable that a more stringent practice does not already exist. The Marine Corps must, once and for all, take steps to break the pregnancy-equals-discharge mindset.

In his recently-published planning guidance, General Krulak observes that "a sense of fairness is key to our manpower processes...." [Ref. 38] The current practice of allowing most pregnant Marines to exit at will is consciously allowing them to

circumvent their service obligations. If fairness is the objective, then female Marines must be held to the same standard as their male and non-pregnant female counterparts.

SUMMATION

Every Marine, regardless of rank, regardless of gender, regardless of ethnicity, regardless of religion, has a special spark burning somewhere deep inside of them. If not, they could never have mustered the courage to put pen-to-paper and join in the first place. With this fact in mind, it must be recognized that every *one* of these Marines that is lost through attrition--totaling over 30 percent of first-term men and over 50 percent of first-term women--possessed that same spark. What a tragic waste of an irreplaceable natural resource.

APPENDIX A. TOTAL POPULATION MODEL RESULTS

The LOGISTIC Procedure

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Wald Chi-Square	Pr > Chi-Square
FEMALE	1	0.9745	235.8878	0.0001
BLACK	1	-0.0798	3.3049	0.0691
OTHR_MIN	1	-0.2552	7.2720	0.0070
HISPANIC	1	-0.3351	33.8912	0.0001
AFQT_PCT	1	-0.0157	334.5064	0.0001
NON_GRAD	1	1.6917	28.4323	0.0001
HS_EQUIV	1	0.6485	82.2701	0.0001
SUMCOLGE	1	-0.6804	12.0410	0.0005
COL_GRAD	1	-0.9376	24.3435	0.0001
WAIVED	1	0.2107	42.9357	0.0001
YOUTH	1	0.1141	2.4973	0.1140
DEP_NON	1	-0.0989	0.8823	0.3476
DEP_ONE	1	0.2512	35.6083	0.0001
DEP_TRE	1	-0.1778	13.0646	0.0003
DEP_FOR	1	-0.1091	5.8911	0.0152
ALT_MOS	1	-0.6535	81.5128	0.0001
MARRIED	1	-0.5592	102.6531	0.0001
TRAD_FEM	1	-1.4185	752.6696	0.0001
NON_TRAD	1	-1.4833	1028.8023	0.0001
ALL_MALE	1	-1.6989	1879.0721	0.0001
ENTR_AGE	1	0.0458	27.2884	0.0001

APPENDIX B. WOMEN-ONLY POPULATION MODEL RESULTS

The LOGISTIC Procedure

(NON_GRADs and ALL_MALE are not present in the Women-Only population)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Wald Chi-Square	Pr > Chi-Square
BLACK	1	-0.6722	5.9891	0.0001
OTHR_MIN	1	-0.2408	0.6011	0.4382
HISPANIC	1	-0.4307	3.8697	0.0492
AFQT_PCT	1	-0.0153	12.9561	0.0003
HS_EQUIV	1	0.4191	0.6474	0.4210
SUMCOLGE	1	-0.2015	0.2561	0.6128
COL_GRAD	1	-1.1823	5.7684	0.0163
WAIVED	1	0.00949	0.0058	0.9391
YOUTH	1	0.0866	0.0914	0.7624
DEP_NON	1	-0.7877	2.3078	0.1287
DEP_ONE	1	0.3435	4.7139	0.0299
DEP_TRE	1	0.0781	0.1872	0.6652
DEP_FOR	1	-0.1632	0.7477	0.3872
ALT_MOS	1	-1.3323	14.5414	0.0001
MARRIED	1	-0.8449	41.5367	0.0001
TRAD_FEM	1	-1.0687	67.0788	0.0001
NON_TRAD	1	-1.3185	31.1820	0.0001
ENTR_AGE	1	0.0212	0.4267	0.5136

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APPENDIX C. PREGNANCY MODEL RESULTS

The LOGISTIC Procedure

(NON_GRADs and ALL_MALE are not present in the pregnancy population)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Wald Chi-Square	Pr > Chi-Square
BLACK	1	-0.2110	0.8613	0.3534
OTHR_MIN	1	-0.4554	0.9790	0.3225
HISPANIC	1	0.0187	0.0046	0.9457
AFQT_PCT	1	0.00144	0.0643	0.7998
HS_EQUIV	1	0.4048	0.4820	0.4875
SUMCOLGE	1	0.9303	4.2416	0.0394
COL_GRAD	1	-0.7507	0.4901	0.4839
WAIVED	1	0.2026	1.5099	0.2192
YOUTH	1	0.1342	0.1308	0.7177
DEP_NON	1	-1.0616	1.0161	0.3134
DEP_ONE	1	0.4332	3.8117	0.0509
DEP_TRE	1	0.3472	1.9119	0.1667
DEP_FOR	1	0.2969	1.2755	0.2587
ALT_MOS	1	-0.6319	1.9474	0.1629
MARRIED	1	1.1631	42.8879	0.0001
TRAD_FEM	1	0.2679	2.3406	0.1260
NON_TRAD	1	0.0138	0.0018	0.9660
ENTR_AGE	1	-0.0958	3.9892	0.0458

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